

AVIATION

JANUARY 29, 1923

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Civil Air Transport in South America: Junkers seaplane over the Magdalena River, Colombia

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Number
5

FOREIGN AIR TRANSPORT BY SEAPLANE
IMPROVED EQUIPMENT FOR NIGHT FLYING
ABSTRACT OF THE CIVIL AERONAUTICS ACT
AVIATION ENGINES AT THE PARIS EXPOSITION

THE GARDNER, MOFFAT CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK



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CONTENTS

Editorials	125	Letters Regarding Air Aircraft	126
Foreign Air Transport by Shipmen	126	Recent British Aircraft Development	126
Progress in Commercial Aviation in France	127	De Havilland High-speed Latin Type Pursuit	127
Aircraft Movements at Le Bourget Airport	127	Flight of the New Germanic Dihedral	127
Vertical Take-off and Landing	128	Germany and the R.A.C.	128
Aviation in Central and Latin America	128	France to Purchase Yorks	128
Engines 80 hp. Aerocar Engine	129	British Strength at European Air Shows	129
"Steel" Decades - "Hicks"	129	1922 Air Show Programmes	129
Improved Equipment for Night Flying	130	Movies of Aviation Apparatus	130
New Phonex Type Radiator	131	U. S. Aviation Developments	131
Automobile Engines for Airplane Propulsion	132	Air and Naval Air News	132
Bureau of the Aircraft Industry	132		

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Editorial

Vol. XIV

JANUARY 26, 1923

No. 5

Foreign Progress in Aeronautics

THE present issue of *AVIATION* contains an enormous amount of information on the present status of aeronautics in Europe. A summary of the various applications of the engine to transport purposes in little developed countries, the strength of some European air forces, some British aircraft development and current movements at the Paris airport are the interesting subjects dealt with.

The participation is a single issue of the varied phases of foreign air activities will enable our readers to judge for themselves what a vast difference there is between the situation in Europe and in the United States. Little British funds are spent on aeronautics adequate for its present needs, and as representative as we know, the British Royal Air Force (which does not include the Aircoane as far as its aeronautics in present time) establishment from 20 to 45 squadrons, France with 328 squadrons aims to have 228—and our own Army Air Service has to be content with only one (at strength squadrons). Many and varied the news stories are bringing the first line of defense of European nations; here they still are scattered as adjuncts of the Army and the Navy.

In the aeronautical field we witness the same developments between Europe and America. One million pounds of aluminum ingots passed through the single port of Paris in the past twelve months—a thousand pounds over the previous year—and this does not include the very important aircraft movements between France and Morocco, which have their terminus in Toulon. This million pounds of aluminum was carried in aircraft bottoms. By accurate undercutting, the value of fast transportation.

What loss is in the country, in place alongside of such precious air transport? Despite its world's perfect running, the Air Mail Service is practically unknown to 99 per cent of our population. Mean there is no cause of demand for air mail delivery. Hence with every movement from year the Air Mail is threatened with disappearance in Congress. The fifty million letters it carries a year are not enough to sustain the people claimed it. Most people are simply unaware of the fact that a letter was carried in an Air Mail is not the Air Mail better advertised?

Possibilities of the Hot-Air Balloon

INTEREST in the aeronautical possibilities of the hot-air balloon, or aerostat, has recently revived in France, the mother country of lighter-than-air craft. The greatly increased cost of coal gas, not to speak of hydrogen, has in much excited French hot-air balloonists that some aeronauts are now endeavoring to turn the difficulty by re-introducing the time-honored aerostat.

As those familiar with aeronautical history know, the first spherical balloon, built by the Montgolfier brothers was kindled by heated air which was produced by burning damp straw under the open neck of the envelope. On later aeronautics there was a nozzle in the center of the circular gallery which carried the ammonia, and this caused the balloon to lift like fire and pitching the aeronaut at flight. But no蒙golfier ever made a very long flight. For this, due to a very small explosive power, and the lift of the balloon quickly decreases as the temperature of the ammonia air drops. Besides the open fire places great odds in the fire hazard, around sources involving long-continued therapy.

The new development of the aerostat project is overcome these two drawbacks by the use of perforated hexagon which will give a much greater lift (about 18,000 calories per kilogram of heat) than straw fire and by sealing the envelope of the aerostat. It is anticipated that even though an increase the lift of heated air will be made less than that of the heat and gas estimator (20 ft. per 1000 ft. as against these 20 to 30 ft.) it will be sufficient for sport purposes, while the fuel carried in a balloon will secure a uniform temperature of the contained air, and so afford the possibility of long flights.

It is interesting to note that the aerostats assumed as a type to be in use a date as 1926, in which year the French government ordered a hot-air balloon of 40,000 cu. ft. capacity. This craft carried eight passengers on one occasion and was the largest hot-air balloon of its kind ever built.

Correcting a Misleading Term

THE aircraft safety questionnaire issued by the United States Civilian Aircraft Safety Administration is excellent opportunity to assist the aeronaut in free of mind application of the N.A.C.A. standard aeronautic nomenclature. The questionnaire asks among others:

"Is the wording of tenth paragraph 371 open to any interpretation, or is it designation sufficiently clear and definite?"

To this every manufacturer who fills out the questionnaire should answer that it is open to misinterpretation in that and paragraphs states "airplane, airship and parts of the foregoing."

An everybody in the aeronaut industry and in the motor boat industry knows—that aircrafts are often intended in that a "hydroplane" is a gliding boat, and not an airplane equipped for use over the water. Response in the instant term which describes the latter. Hence the wording of the law is nothing but clear and definite, and the misinterpretation which may result therefrom should be prevented by the use of the correct term.

Foreign Air Transport by Seaplane

Belgian Congo, Republic of Colombia and French Guiana Afford the Principal Fields of Activity

By Ludovic d'Orcy

Little is known in this country of foreign air seaplane transport. At a number of ports, there are seaplane bases, and their operations, however a few exceptions, are of limited extent. According to the latest available records there are, including the Aeromaritime, at present five regularly operating seaplane transport services in the world.

Europe and Africa Review

In Europe there is the French Compagnie Aéropostale, which operates Lyon & Orly flying boats between Andorra, France, and Algiers, a distance of 130 miles. This service is to be extended by way of Sétif to Bône, Tunis, Tunis, at which point the north of Tunis will be covered. The service will be extended to the south by a new flying-boat service between Antibes and Hastings, England, which has been started. This service, and the trans-seas Mediterranean, which in 1928 operated flying boats between Barcelona, Spain, and Palma de Mallorca, has been discontinued. A British firm, the British Aeroplane and Motor Co. of London, Ltd., is to open a new flying-boat service between Southampton, Chichester, and the Channel Islands, using Supermarine flying boats. The length of this route is about 120 miles.

In Africa we find the Belgian government maintaining a passenger and mail service, the Belgian Congo, using H.L. flying boats connecting Stanleyville and Stanleyville, following the course of the Congo river. This service has earned much praiseable safety, for it carries passengers and mail to cover the 1200 mile distance in three days whereas the other available means of communication require many weeks.

In the Americas there are three foreign transport companies, mail and regular services. In North America, the Aeromaritime already mentioned, and in South America two, the Compagnie des Transports Aériens Guayaquil, in French Guiana, and the Brazilian Companhia Aérea Brasileira, operating between Rio de Janeiro and Belém. The French firm known as the "A.D." operates Farman G.L. flying boats and Belgian fleet seaplanes along the coast from Dakar to Mombasa, and thence into the interior, following the Masai river, the former being least. The number of passengers carried is not available, but appears, as in the case of the Belgian Congo, the number of modern transport facilities other than aerial ones, growth

thrusts the air line, which is not only used for emergency mails and passengers, but also for valuable goods shipped by air from the mines in the interior.

It would be interesting to compare detailed operating figures of the various seaplane services, and also their performance measures as they take place under various climatic and local conditions. Unfortunately, this information is not readily available. We have, however, some figures from the SCADTA, which is to be the Aerotransport Aéropostale, which is popularly known as the SCADTA, some very interesting information and photographs of their operations, and these are reproduced on the next page.

The SCADTA and its achievements

The SCADTA was founded in December 1928 at Bogotá, Colombia, by a group of Colombian and American business men for the purpose of operating air mail services between the Atlantic coast and the capital, Bogotá, which is situated over 250 miles in the interior. By means of rapid railroad routes between the capital and the coast, the only ordinary roads being extremely bad, mail and passengers were shipped by railroads over 1000 miles to Guatavita, where they were loaded to Bogotá. The two routes under most favorable conditions require eight days and eight.

In October, 1928, two Junkers cabin monoplanes equipped with floats, which the SCADTA had purchased in Germany, arrived in Barranquilla and took up the "Magdalena" route to Guatavita, the distance being 100 miles. The number of passengers almost a year passed before a regular service could be inaugurated for air ground suspension routes, and it was not until in September, 1929, that a regular weekly service was inaugurated between Barranquilla and Guatavita (200 miles) and Guatavita and Neiva (100 miles). Later, two more monoplanes were bought, one for Barranquilla and one for Neiva, thus increasing the distance to 175 miles, and more aircraft were added to the fleet of the company. The new consists of six Junker float monoplanes, two Fokker monoplanes, and a Béchereau-Pigeon flying boat.

An interesting feature of this service is that it is not a mail service, but a passenger and mail service. Instead of receiving a subsidy proportional to the number of passengers and weight of mail carried, no subsidy or none, European



Fig. 1.—Aerial view of the harbor of Cartagena. Fig. 2.—Passenger and mail are taken on board a seaplane at the SCADTA.



Fig. 3.—Taking off. Fig. 4.—Portion of the Magdalena river with rapids, a rugged bit of water of this we route.

countries, the SCADTA holds a franchise from the Colombian government, under the terms of which the company is responsible for mail, cargo, and passengers made and sent by air on routes established. The mail rates are as follows: for every 15 grams of first class and (letter), and of this 15 per cent goes to the government. The passenger fare from Barranquilla to Bogotá is \$55.00 (Colombian) for a one way trip.

The adaptation of the aircraft of the SCADTA, to the particular needs of the Colombian market, took a year and a half. This work of adaptation, the company having had no aerial interests and paying very expensive, resulted from continual experimenting. The all-metal Junkers cabin planes, which form the bulk of the air fleet, have been selected for Aeromaritime and also for the Air Force in Colombia, and are considered the best in the world. They have been adapted to local conditions in the result of lengthy experiments, and the machines perform exactly as they do in Europe. The payload of these ships is 300 kilograms, or from four to eight for passengers.

A very remarkable feature of this service, on account of the special climatic conditions prevailing, is the regularity observed in operation. Out of 280 trips made on the 250 miles route between Barranquilla and Guatavita (there have not made the same date, the date being due to minor engine trouble), the record of safety has been very satisfactory, and a single passenger as pilot having been killed or injured so far. The company attributes this excellent showing, which is particularly notable in view of the country's lack of general facilities, to the use of seaplanes which naturally follow the natural waterways and are always within gliding distance of a safe landing place.

On the outward bound flights, from Guatavita to Barranquilla, and a single connection with mail streams was made in the 200 miles distance. From these figures it may be seen that SCADTA has made a very rapid development, and is already favorably with that of the best organized European air transport companies. The accompanying table gives some interesting data on the operations of the SCADTA for the first six months of 1929.

PERFORMANCE TABLE, JANUARY-JUNE 1929 OF THE SCADTA AIRLINE

Month	No. of Flights	Passenger Miles	Mail Miles	Passenger Miles	Mail Miles	No. of Passengers	Mail Weight
Jan.	46	240	100	32	40	42	42
Feb.	46	240	110	32	40	42	42
Mar.	46	240	110	32	40	42	42
April	46	240	110	32	40	42	42
May	46	240	110	32	40	42	42
June	46	240	110	32	40	42	42
Total	276	1,440	660	468	720	252	252
Total	276	1,440	660	468	720	252	252



Farman G.L. passenger flying boat (300 hp. Borelli engine), used by the Aeromaritime airline, carrying 14 passengers, is shown on the water in the Belgian Congo, Africa.

Part 3 provides that, excepting certain specified cases, the Secretary of the Treasury may regulate the use of aircraft in commerce, and directs that Admiralty practice as referred to may be followed.

Part 4—LAWS RELATING TO COMMERCE IN AIR TRANSPORTATION

Part 4, Laws Relating to Commerce in Air Transportation, made as follows:

SEC. 311. All laws of the United States which are applicable to commerce, transportation, or navigation generally shall, as far as practicable, be held applicable to commerce, transportation, and navigation by air unless such laws apply by other provisions of this Act or are set by them specifically made applicable to commerce, transportation, or navigation by air or by such as to render them applicable when conducted by enterprises other than railroads.

Part 4—LAWHATY OF COMMERCE IN AIR TRANSPORTATION

Part 4 regulates the liability of common carriers in air transportation, the principal provision is as follows:

SEC. 312. (a) Any carrier rendering in the United States services of transportation or navigation, or any carrier engaged in commerce referred to in the Civil Aeronautics Act, shall incur a bill of lading liability. The initial carrier shall be liable in the holder of the bill of lading for the full amount of any loss, damage, injury to each property of the lessor, damage, or injury caused by such initial carrier or by any subsequent carrier, or to whom the property is delivered, or ever whom from the present time to the end of the period of the property of the property or through bill of lading. The liability imposed upon the initial carrier shall not be held to relieve the carrier actually causing the loss, damage, or injury from liability.

(b) If the loss, damage, or injury occurs while the property is in the custody of a carrier by water, the liability of such carrier shall be determined under the laws and regulations applicable to transportation by water, and the liability of the initial carrier shall be the same as that of the carrier by water.

Part 4—PERMIS USE OF NAVIGABLE AIRPORTS

Part 4 provides that the navigable airports is a public utility, are thus to be regulated.

SEC. 313. The use of the navigable airports of the United States is hereby declared to be necessary for commerce among the several States and with foreign countries, for the safety of navigation, and for the public welfare, and for the national security and defense, such use, except as is otherwise to be required for such purposes as a public right of freedom of navigation by airways.

SEC. 314. Except as the Congress may hereafter provide, all navigable airports of the United States, and the right of the public to safe navigation of flight, prescribed by the Secretary under this Act, is declared to be navigable airspace.

Part 4 and 5 subjects airports to the related code to cover offense committed on board an aircraft.

TITLE IV—APPLICATION OF EXISTING LAWS TO AIR NAVIGATION

This title applies the existing law to air navigation. Part 4 applies the Tenth Act of 1926 to related aircraft under its meaning. In some cases.

SEC. 401. In such cases as the Secretary of the Treasury shall by regulation prescribe, the master of every civil aircraft shall, when in the United States, or a place where the Secretary of State, or his successor, has a diplomatic or consular station, or an embassy, designated for a place in the United States, shall have on board his aircraft a manifest in a form to be prescribed by the Secretary of the Treasury and signed by such master under oath as to the truth of the statements therein contained. The master of every aircraft, and the Secretary of State, or his successor, shall have the right to inspect the manifest of aircraft preliminary to the issuance of the certificates of registration. Considering that there are no laws in this country compelling registration and inspection of aircraft and pilots, it is encouraging to note that our regulators measure favorably with those of the Canadian Air Board, whose regulations is simplicity by law.

Rogers—Aircraft—Canada, M. Underwriters' Laboratories, Inc.
Revised—1932.
Revised—Pilots—Canada, T. Underwriters' Laboratories, Inc.
Revised—1932.

Part 4 amends the regulations of Public Health regulations (applicable generally to all airports).

Part 5 includes air navigation in the provisions of the Immigration and Naturalization Act, and amends the Domestic Drug Import and Export Act to bring air navigation under its provisions.

Part 5 provides for the official adoption of standard as aeronautical as far as possible under the Civil Aeronautics Act.

TITLE V—MISCELLANEOUS

SEC. 501. Miscellaneous deals with the Weather Bureau and the National Weather Service, and provides that any part of the Civil Aeronautics Act which is declared unconstitutional, the remainder shall remain in force as far as it can be made.

WINTER AIRWAYS

SEC. 502. Section 3 of this Act entitled "An Act to increase the efficiency and reduce the expenses of the Signal Corps of the Army, and to transfer the Weather Service to the Department of Commerce," is amended. October 1, 1932, as amended by adding at the end thereof a new paragraph to read as follows:

"It shall be the duty of the Chief of the Weather Bureau, under the direction of the Secretary of Agriculture, (a) to forward to the Signal Corps reports, forecasts, warnings and information to be received by the Signal Corps and the Weather Bureau in the United States and upon the high seas, particularly upon air routes designated and approved by the Secretary of Commerce under the provisions of section 211 of the Civil Aeronautics Act of 1932, as established under other authority of law, and (b) for such purposes to observe, measure and record flight atmospheric phenomena, and such meteorological actions and stations.

ARMED COMMISSION FOR AERONAUTICS

SEC. 503. The membership of the Advisory Committee for Aeronautics is increased from 13 to 26 members, to be appointed by the President. One-half of the independent members shall be appointed by the Director of Civil Aeronautics, the Office of the Assistant Postmaster General in charge of the Air Mail Service, and the Coast Guard.

STANDARDIZATION

SEC. 505. If any provision of this Act is declared unconstitutional or the application thereof to any person or corporation is held invalid, the remaining provisions of the Act and the application thereof to other persons and corporations shall not be effected thereby.

Air Activities, Underwriters' Laboratories

Underwriters' Laboratories shall copy and repeat, concerning their activities during 1932, what the following statement made to the American Society of Safety Engineers:

"This Experiment is now a little more than one year old. The response from the commercial industry has been small compared with that of other industries at older departments. But the co-operation obtained is proportional to the enormous interest of the country in aeronautics.

"Our Aircraft Register shows thirty-three registered aircraft, and the number of aircraft registered for the first registration certificate which were not yet given as follows: twenty-nine certificates were granted, two refused and one was suspended following a crash. There were received six requests for certification of airworthiness which were denied. Two are still pending, and two were refused.

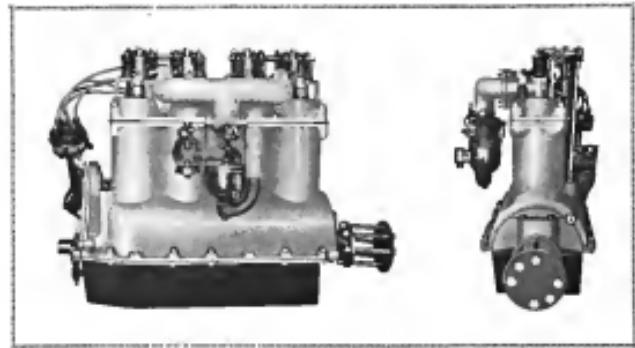
"Thirty-five have been appointed to the various aviation stations throughout the United States as test and inspection stations. These stations are capable of making the necessary inspection of aircraft preliminary to the issuance of the certificates of registration. Considering that there are no laws in this country compelling registration and inspection of aircraft and pilots, it is encouraging to note that our regulators measure favorably with those of the Canadian Air Board, whose regulations is simplicity by law.

Rogers—Aircraft—Canada, M. Underwriters' Laboratories, Inc.
Revised—1932.

Revised—Pilots—Canada, T. Underwriters' Laboratories, Inc.
Revised—1932.

The Rogers B4 Air Cooled Engine

Light Weight Power Plant Designed For Durability and Cheap Uptake



Side and end views of the Rogers B4 Aircraft Engine

In developing the Rogers B4 aircraft engine 45 hp, vertical engine it has been the aim of the builders, Rogers Aircraft of Fort Worth, Tex., to produce at low cost a durable and efficient light weight power plant for the sport plane, ice sled or wind wagon, with inexpensive replacement parts readily available.

Direct cooling is achieved in the B4 without propelling fans, the valve sprays, rocker arms, valve stems, valve caps and the valve clearance—1½ in.—are all designed to prevent heat to carry off the surplus heat. The manufacturers claim that enormous tests have proven that the B4 needs perfectly fit lights.

By having the intake valve in the head the charge is carried directly to the top of the piston, while with the exhaust valve in the head the heat is carried away from the cylinder after the exhaust valve opens than with the L head type. From the accompanying illustration it will be seen that there are no pockets on the exhaust valve head to hold the heat, nor is the exhaust head to the head as in many air cooled engines.

Cast iron cylinder heads are made of 40-48 carbon steel. While their weight is only 15 lb. each, including bearings and caps, they have proven perfectly strong.

Downward valves are used. They are fitted with four rings, three compression and one wiper, which carries all the oil back to the crank case and prevents leaking of the plugs. Although designed in sheet to be yet lighter than aluminum, it is claimed to have exceptional working qualities, as would appear from the following mechanical properties:

Specific gravity, 1.06
Elastic limit, 15,000 lb. per sq. in.
Breaking point, 3,110 F.
Tensile strength, 22-24,000 lb. per sq. in.
The piston complete with bearings only weighs 34 oz., the

advantage of lightness insuring increased power and reduced weight.

Strong, light and durable cylinders have been made by the use of the best gray iron. The head is also of iron. The engine is cast from aluminum, but no sharp bends and no inside measurement—15 in.—are large.

The cooling system is of the splash system, without gear, pump or valve.

Aerolite lead battery ignition is used. Two batteries insure uninterrupted ignition in case one sets out, turning maximum amperes with minimum weight.

A current meter for all speeds is coupled with the cylinder carburetor, adjusted to live, intermediate and high speeds.

SPECIFICATIONS OF THE B-4 CYCLE MOTOR

Displacement, 37.42
Bore x stroke in.
Cast iron, 3.50 x 3.50
Aluminum, 3.50 x 3.50
Stroke, 3.50 in.
Weight, 100 lb.
Water, 40 lb.
Oil, 10 lb.
Gasoline, 10 lb.
Oil consumption, per hr., 0.11 lb.
Oil consumption, per hr., 0.11 lb.

"Speed" Displaces "Hliko"

The Editor of the aeronautical magazine *Wiflito*, organ of the Japanese Aero Club of Tokyo, after the January 1932, *Speed* will take the place of *Hliko* as the official organ of the Society. The editorial office of *Speed* is at 1, Tsurumishacho, Kifijimoku, Tokyo, Japan.

Improved Equipment for Night Flying

Flashing Aerial Lighthouses Will Show Limits of Field and Direction of Wind

The highest development of every form of transportation comes in the production of standard signals which indicate to the public the movement of aircraft. With the "Aero-Contest" issues we turned in Chicago or New York every foot of its thousand-mile run to be marked by standard block signals. When the Monitors in balloons from here and New York are guided through the issues by "Aero" signs and signals of high voltage in motion, the same rules are followed. It is this precision that even induces the belief in aviation of signal precision in the marine and land traffic field.

One of the best developments in this connection was the erection shortly after the Aviation of visual indicators at the Chicago airport near the British Air Ministry, by the Aeroplane and Automobile Co., (U.S.) Ltd., of London, which is affiliated with the American Air Association Co., Elizabeth, N. J.

Most recent reports from London indicate that London's marine service with night flights is quite within the realm of possibility, although the British Air Ministry plans soon to open a signal station and service between Croydon and London. The first signal to be erected is to be located at the end of the evening flight to Paris, to denote a road of Monarchs and still have time for a few hours' rest before returning to his nest at the start until the next day.

The night service, which will be started in the spring, will be tried first in an experimental test it is intended to lay the foundation of a regular night service. The day flight of the Croydon service is already a large success. But the possible subscribers have found their chief value as a means of transport for men at large, discounted by the fact that there is no night service. The bulk of England's foreign mail is, in fact, that which is posted in the city at the close of the day's business.

Along the coast-Channel are coast lighthouses, which throw their beams into the clouds, have been erected by the Air Ministry, and emergency landing grounds, effectively illuminated at night, are to be constructed. Already five field roads from the London terminus to Lympne, where the aeroplane will rest over the Channel, is a field beam of light.

Landing Field Signals

Now has just been received a report of important developments which are a step further than the first efforts of Croydon and which but few to have a tremendous influence on the future of aviation in this country.

The laying of standard routes with emergency landing fields, to be indicated by signals, will usher in night flying and open an era of expansion in the air which will be only comparable to the period of development during the past ten years in the automobile industry.

As mentioned in the May 26 issue of *Aero-Contest*, an aerial telephone has been developed by the British Gas Association. This light is to be hung from an altitude of several miles above the station. In addition to being a forewarning signal light, the structure is designed to be an observation tower which is glass enclosed and protected from the elements. Much interest has been shown in this installation and early returns are favorable. A further development of this type of system appears for use at coastal stations.

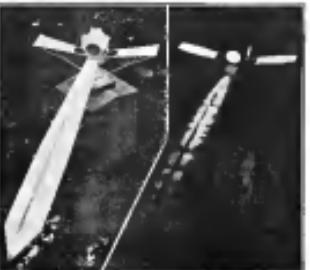
Another problem presented in the development of trans-continental airways, such as is now being laid out from Chicago and Cheyenne, a part of the New York to St. Paul route made by the Post Office Department. In this case it is necessary to have standard emergency fields which are quickly visible by day and night.

To meet this situation the Aeroplane Gas Association Co. which is also actively engaged in the marine and land traffic

engineering field, has developed two devices—the Field Lamp Tower Beacon and the Ground Wind Indicator. The "Aero-Contest" issues are turned in Chicago or New York every foot of its thousand-mile run to be marked by standard block signals. When the Monitors in balloons from here and New York are guided through the issues by "Aero" signs and signals of high voltage in motion, the same rules are followed. It is this precision that even induces the belief in aviation of signal precision in the marine and land traffic field.

Aero Ground Wind Indicator

Indicators of the Field Lamp Beacon series are intended to be visible for only a limited distance, as is necessary to have a strong light which will be visible for 22 to 15 miles, thus enabling the location of emergency landing fields in regular intervals of 20 to 25 miles apart. As illustrated the Aero Ground Wind Indicator is constructed to the form of the



Ground Wind Indicator, A.G.A. type, as it appears in daytime and by night

letter T, analogous to the style universally agreed upon for the indication of landing areas and will be visible at a distance and night indicator from the sky. The Ground Wind Indicator resembles a small airplane which rotates automatically and which will always be held to the wind.

The direction of the Ground Wind Indicator will be visible when it is held in the horizontal position by the hand. By holding these lights located in the same position in each field, the pilot will be able accurately to gauge his landing from the location of this light.

The Ground Wind Indicator is a combination of aviation lighthouses and landing airways with a ground signal for the pilot. The device developed by the Aeroplane Gas Association Co. is so constructed as to require no maintenance or dependable operation. The flashing light is operated according to the same principles as the marine beacon which will be found in the most of fields and which is being used now for two years with the best results.

The A.G.A. Wind Indicator is mounted upon a small case structural housing which contains the necessary tanks which are recharged at definite intervals. This will place the light about ten or twelve feet above the ground, as is done to

avoid the ground eddies as far as possible. The light will flash and be alternately on, turned off and on according to the prevailing degree of light and darkness. A ratio of this type keeps the British Coggin light into action during the last quarter of the sun.

The tail of the "T" will be 22 ft. long and about 22 in. wide at the lighted extremities, and will be about 24 in. at the 22 ft. mark. The shorter extremities bearing the arms of the tail will be 4 ft. long and 2 in. wide at the lighted ends, and taper to 12 in. at the lighted end. The lenses and the bases of the indicators are mounted on ball bearings and are free to rotate about a central axis. Thus the "T" will always be held level to the wind.

Wind Indicator

The indicator is the unique device mounted on top of the "Aero" Ground Wind Indicator. It automatically turns off the flashing light in the daytime and turns it on at night or during periods of low visibility. It is operated by the action of wind pressure and is so constructed that it operates even in temperatures of 100° F. The entire indicator, as is the rotated block body is surrounded by highly polished polished metal, light and therefore least, falling upon most strongly is obscured by the black crater and reflected by the same glass elements. Consequently the black portion extends under the influence of light in a greater extent than the pointed ele-

ment, this difference in exposure is utilized to open and close a gas valve, turning the light off and on according to the prevailing degree of light and darkness. A ratio of this type keeps the British Coggin light into action during the last quarter of the sun.

The light points are spaced upon each of the three bases of the indicator, three are required at 21,000 candlepower. It can be seen as a dot signal at a range of about 5 miles when observed from normal flying heights. At a 10,000 ft. altitude and in definite shape, it can be seen in more than 12 miles and the shape and the direction of the wind can be easily established from a distance of three to four miles.

Indication of Station Field

The Ground Wind Indicator, together with the set of four Field Lamp Beacon series, mark the limitations of the field, are being tested installed at McCloud Field, Dayton, Ohio, for the Post Office Department for adoption on their emergency landing air route fields and, if approved, will be recommended for the Chicago Cheyenne route to equip all emergency landing fields.

The Ground Wind Indicator which has been in service on the Detroit Field route has given excellent satisfaction.

New Pioneer Flight Indicator

A Combined Bank and Turn Indicator of Small Size and Light Weight

The Pioneer Instrument Company's latest model Flight Indicator, which is a combined Turn Indicator and Bank Indicator, is the most compact and lightest indicator. This is much smaller in size and weight than other models. This model is but 2½ in. in diameter, and the weight is under 12 ounces. Turns are indicated by the movement of the hand in the right as left, and the banking indication is given by the bank-indicating mechanism.

It is also very compact, the new small weight indicator, the claim is, is able to drive the Flight Indicator. It weighs less than 5 oz. and has very low head resistance.

While the Pioneer Company's principal customers at present are the Government Air Services, they have great faith in civil aviation, and have made up a stock of Flight Indicators for commercial use. These instruments are man-

ufactured and sold on the United States under exclusive license.

The Flight Indicator is used for controlling the flight of aircraft under conditions of poor visibility, or slips for any reason it is desirable to eliminate pivoting or turning, and to



Small Flight Indicator which replaces the Fly-by-wire

indicate a lateral level attitude. It can also enable the pilot to hold the aircraft in a horizontal position.

A compass, by the use of its fixed value when flying in clouds as right, as it is practically impossible for a pilot to hold his ship on a straight course, and a compass will only indicate correctly during straight flight or on very slow turns. By using a Fly-by-wire indicator, the pilot need not turn his head frequently, the pilot avoids turning, and his instrument will function properly. A straight course is maintained by steering so as to keep the hand in the central position. By keeping the hand in the center of the stick the aircraft is held horizontally level when flying straight, or as the correct bank when flying in clouds.

The sensitive element of the turn indicating mechanism is a small air driven gyroscope, operated by the vacuum source from a vacuum tube. The gyro is mounted in such a way that it rotates only to indicate about a vertical axis, being indicated by a dial or plate.

The gyroscope used in the Pioneer Flight Indicator has been tested out very carefully. The whole instrument is non-magnetic, permitting it to be used close to the compass. Adjustment of sensitivity is readily made to suit any flying conditions. The gyro can be speedily detached from the gyro base, to which it is supplied from a reservoir within the gyro.



The new Pioneer Flight Indicator which only weighs 12 ounces

Aeronautical Engines at the Paris Exposition

Exhibits Range from 1000 hp. Lorraine-Dietrich
To 10 hp. Gnome Radial for Auxiliary Sailplanes

The following notes on the aero engines exhibited at the Paris Salon are reproduced from our excellent English-language *Aviation*. The accompanying table of characteristics is from *L'Aviation*.

Avions

The Avions exhibit covered the whole range of their well-known model engines—which differ very little from those produced before the war—except that in all cases the model salons are now mechanically operated. The types in production are 30-hp. 3-cylinder, the 50-hp. 6 cylinders, and the 100-hp. 10 cylinders. These engines are extensively used for training and racing machines and appear to give excellent service.

Farman

The Farman engines, which have appeared at the Salons for these successive years, have it is said passed the French government type test, and the Farman firm has it in stock for immediate delivery.

At present there are three Farman engines being offered— a 100-hp. 8-cylinder V, a 160-hp. 12-cylinder V and a 200-hp. 18-cylinder W type. The 100-hp. model seems to have been discontinued. The 160-hp. 12-cylinder V has been superseded by an engine of similar power and equal number of cylinders, known as the W type. The general design however is not greatly altered.

The two engines are of similar design, and employ similar

crankshafts and connecting rod units, valve gear, etc., and differ only in that one has a four-bladed crankshaft and four rows of cylinders, and the other a six-bladed crankshaft and six rows of cylinders. The cylinders are of equal bore but the 160-hp. model has an increased stroke.

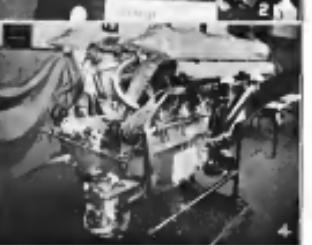
The cylinders are arranged front and rear, two cylinders being within each cylinder bank and two banks up in two cylinder blocks each with a common cooled sheet metal water jacket. There are four constant ratios per cylinder—two of each hand-operated by leather arms and pitch rods from controls carried in the top of the crankcase. Abutment plates and bellows are used to prevent noise.

The big end assembly is of the usual articulated type—the pointer rod carrying the white metal journal and being provided with deep flanges on the big end casting between which the two side rods are passed.

The engines are fitted with two magnetos and a generator and a four-bladed direct current motor is supplied with the Farman aero engine. The vibration motor for the aeroplane. A series of gear gears are standardized and interchangeable one with another giving a choice of gear ratios of 1:1.5, 1:1.84, 1:1.67 or 1:1.5. Sheet drive can also be provided.

Castrol and Rhône

The Société des Moteurs Gnome of Billancourt exhibited the well-known Le Rhône engine in the standard 80, 110, and 160-hp. models—which show no change of any kind. In addition they exhibited the "Jupiter" 400-hp. air-cooled radial, de-



New aero engines at the Paris Salon:—(1) 26 cyl. 800 hp. Pugnat-Lorraine, (2) 22 cyl. 200 hp. Pugnat-Lorraine, (3) 26 cyl. 300 hp. Pugnat-Dugast zone prime gear, (4) 22 cyl. 250 hp. Gnome.

122

TABLE OF CHARACTERISTICS OF ENGINES AT THE PARIS SALON

Type	Rated B.H.P.	Revolutions per min.	No. and type of cylinders	Bore (in.)	Stroke (in.)	Weight (lb.)	Dimensions (in.)	Dimensions (in.)		Consumption per hr. in (lb.)
								Per min.	Per hr.	
Avions	200	1200	12	2.12	1.12	1100	48.5 x 32.5 x 22.5	1000	1000	100
—	110	1000	—	—	—	—	—	—	—	—
—	80	1000	—	—	—	—	—	—	—	—
—	50	1000	—	—	—	—	—	—	—	—
—	30	1000	—	—	—	—	—	—	—	—
Bréguet-Michelin (2)	800	1200	12 (200 x 160 x 144)	2.50	1.12	2000	62.5 x 37.5 x 22.5	1200	1200	100
Bréguet	1000	1200	12	2.00	1.12	1800	55.5 x 32.5 x 22.5	1000	1000	100
Bréguet PI	800	1200	12	2.00	1.12	1600	55.5 x 32.5 x 22.5	1000	1000	100
Bréguet	600	1200	12	2.00	1.12	1400	55.5 x 32.5 x 22.5	1000	1000	100
Bréguet M100	1200	1200	10-cyl.	2.00	1.12	2000	62.5 x 37.5 x 22.5	1200	1200	100
Bréguet-Sabine	100	1200	—	—	—	—	—	—	—	—
Castrol-Dietrich (2)	1000	1200	12	2.00	1.12	1800	55.5 x 32.5 x 22.5	1000	1000	100
—	400	1000	12	2.00	1.12	1600	55.5 x 32.5 x 22.5	1000	1000	100
Pugnat-Lorraine (2)	200	1200	12	2.00	1.12	1600	55.5 x 32.5 x 22.5	1000	1000	100
Pugnat-Lorraine	100	1200	12	2.00	1.12	1400	55.5 x 32.5 x 22.5	1000	1000	100
Pugnat	80	1200	12	2.00	1.12	1200	55.5 x 32.5 x 22.5	1000	1000	100
Bréguet	60	1200	12	2.00	1.12	1000	55.5 x 32.5 x 22.5	1000	1000	100
Bréguet-Ap4	400	1200	—	—	—	—	—	—	—	—
Castrol	400	1200	—	—	—	—	—	—	—	—
Castrol	300	1200	—	—	—	—	—	—	—	—
Castrol	200	1200	—	—	—	—	—	—	—	—
Castrol-Dugast (2)	300	1200	24	2.00	1.12	1800	55.5 x 32.5 x 22.5	1000	1000	100
—	200	1200	24	2.00	1.12	1600	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	100	1200	24	2.00	1.12	1400	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	80	1200	24	2.00	1.12	1200	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	60	1200	24	2.00	1.12	1000	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	40	1200	24	2.00	1.12	800	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	30	1200	24	2.00	1.12	600	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	20	1200	24	2.00	1.12	400	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	10	1200	24	2.00	1.12	200	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	8	1200	24	2.00	1.12	150	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	6	1200	24	2.00	1.12	100	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	4	1200	24	2.00	1.12	60	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	3	1200	24	2.00	1.12	40	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	2	1200	24	2.00	1.12	30	55.5 x 32.5 x 22.5	1000	1000	100
Castrol-Dugast	1	1200	24	2.00	1.12	20	55.5 x 32.5 x 22.5	1000	1000	100

(1) Two newest types of engines exhibited with equal capacities.

(2) Model 1000-hp. engine by Castrol at the Paris exhibition.

(3) Estimated at 10 day weight at 1000-hp. and 2000-hp. models.

valued by the Bréguet Aeroplane Co. for which this firm has now accepted the Farman rights.

The only other novelty on the stand was a two-cylinder air model fuel cell of the type used on motorcycles, fitted with a reduction gear and a propeller hub, and described as a 10-hp. engine for "aerostats."

Avions

The Société Anonyme des Ateliers d'Établissements Dietrich at Paris exhibited three 800-hp. overhead camshaft models, with several examples of the newer type of engine fitted with push and pull operated valves. These were first exhibited in 1920, but did not yet appear in large form until the Paris exhibition.

There were also two larger engines, left up from varying combinations of smaller cylinder blocks. There is a 34-cylinder W type of 1,000-hp., an 18-cylinder W type of 1,200-hp., both of which were shown.

Castrol

The Société Anonyme des Ateliers d'Établissements Dietrich exhibited their exhibit in their well-known standard 800, 1000, and 1200-hp. types.

(2) Fitted with supercharger.

(3) Standard weight.

Between these ends—so to speak of the engine—there is mounted a pump, which drives with a gear wheel on the propeller shaft. This shaft passes through the crank case of the forward 8-cylinder unit directly above the propeller.

As in the case of the Hispano-Suiza 1000-hp. engine and other auxiliary drives are taken from the center of the engine instead of from one end. The obvious intention of the designer is to avoid the crankshaft whip, and the risk of longitudinal vibrations to which these shafts are liable owing to their necessarily great length.

Avions Hispano-Suiza

The Hispano-Suiza Avions exhibited two new engines but confined their exhibit to their well-known standard 800, 1000, and 1200-hp. types.

Castrol

Two of the well-known Castrol engines, the "Maurice" of 200-hp. and the "Maurice" of 250-hp. were exhibited under the above types. These engines differ in no way from the similar models made in England by the Boulton Paul Co.

Sabine

The Hispano-Suiza Avions Sabine showed a complete range of their well-known radial engines.

This is a small 9-cylinder air-cooled radial, intended for school work, developing 300 to 1200-hp. and is known as the AB-9. It is of model features it is very like the AB-8 of 250-hp. exhibited at the previous Salon—and also at this.

The main dimensions of this new model are given in the accompanying table.

For the rest the firm exhibited the AB-12 air-cooled, a cylinder of 260-hp., the well-known AB of 200-hp., the AB-12 of 300-hp., and the GM-12—a two-row edition of the AB developing 600-hp.

and individual examinations may be prescribed by the Chief of Air Service.

4. Junior aviator pilot-Graduates from the National Guard and reserve officer course of the Air Service Bases and Technical Schools.

5. Senior aviator—Graduates from the observation course of the Air Service Advanced Flying School.

6. Advanced aviator—Graduates from the Air Service Bases and Technical Schools.

Naval Aviation

Naval Air Massons & Parsons—In connection with the usual movement of the massons and Parsons of all the United States naval flying forces off Panama and the Pacific coast waters, the naval forces of the Navy on the Atlantic coast will stage the greatest air exercises ever attempted, here or abroad, according to plans just being finally completed by the department.

On Jan. 7, hydrolic planes, bombers, scouts and torpedo planes will meet in two exercises over a period-heretofore never half of them. The torpedo and bombing planes have in their destination, Key West. The other exercises, the P-11 bombing squadrons, started on Jan. 15, from the same base at Hampton Roads, with the Pacific exercises as their destination, a round the world flight of the P-11s, which will be preceded next month by the largest number of planes ever assembled. The planes going to Key West will have on their course, the U.S. States, as well as naval stops, and the Latin American and Many of the Isthmian Squadrons, at supply stops. The U.S. Langley, the Navy's air and early aircraft carrier, left Hampton Roads on Jan. 19 for Panama, where she will be during the winter months.

The entire movement of the Atlantic forces will be under the command of Capt. W. E. Gifford, Commander, Aircraft Squadrons, Scouting Fleet. His wife have an 18 mile and acting staff of staff, Lt. Comdr. Waddington Captain. The Scouting Fleet will be under command of Capt. Comdr. J. C. Moore, and the Torpedo Squadron will be under Lt. Comdr. H. J. Hart.

The western plane squadrons will sail half dozen Conradi-American ports en route to the Canal, and the naval squadrons that precede the visit of our warships to foreign ports are being given strength with the State Department.

The eighteen training planes are scheduled to leave Key West on Jan. 28, the first stop being Manila, China. They will stop at Hong Kong, Siam, Singapore, Malaya, Sumatra, and off the coast of Vietnam, Borneo, British Honduras, Trincomalee, Ceylon, Mauritius, Cape Horn, Rio, Santos, Brazil, and Cuba.

Under the plans still on the drawing board, Scouting Fleet or Advanced Squadrons, as both, will be used as the transport for members of the House of Representatives, Senators, members of Congress and news writers.

* * *

Aeromarine Squadrons in the Scouting Fleet—The General Order which will affect a new organization for the organization of the Naval Air Service, did not yet permit itself to be finalized at the Pacific Fleet, the Scouting Fleet, and the Fleet Air Force.

For the time being, owing to shortage of equipment, only the Scouting Squadrons will have aircraft squadrons, as follows:

4-12. Wright, Breguet and aircraft leader, Capt. W. H. Glavin, Commanding, Air Squadron.

Eighteen P-11 training planes.

Eighteen P-11 combat planes.

The Torpedo Plane Squadrons, Scouting Fleet, left Hampton Roads, Naval Air Station at Key West, Fla., on Jan. 8. The Aeromarine Squadron, Wright left the same day, Jan. 11 for Guantánamo Bay, Cuba.

The Scouting Fleet, now in the Atlantic, and the Battle Fleet, now on the Pacific coast, are to effect their junction at Panama on Feb. 10. Fleet maneuvers will take place between that date and March 31.



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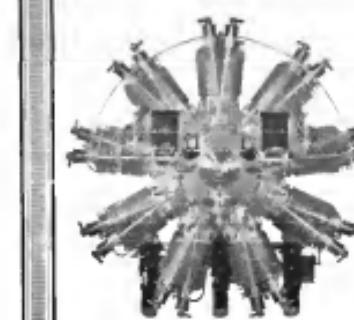
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INDEX TO ADVERTISERS

A

Aero-Products, Service Directory..... 142

C

Classified Ads..... 118

Curtiss Aeroplane & Motor Corp..... 118

D

Duglas Wright Co..... 142

Detroit Marmon-Knight Engines Co..... 139

J

Johanns Aeroplane & Supply Co..... 141

L

Leverett Auto Engine Corp..... 139

M

Martin, The Glenn L., Co..... 140

N

Northrop, Marvin A..... 140

O

Offices, Clarence A..... 141

T

Thomson-Krebs Aircraft Corp..... 138

V

Wright, Charles, Corp..... 139

W

Warren, Edward P..... 140

Wellington, Sears & Co..... 140

Where to Fly..... 139

Wright Aeroplane Corp..... 139

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All in the Day's News

If you look at the Flying news in the papers for the past year you will be struck by a significant fact.

A high proportion of the most meritorious performances in the air are noted in the press to be those of Glenn L. Martin machines.

This is not to be wondered at when it is realized that since men first flew, and until 1916, army officers spent more hours in the air in Martin planes than in all other makes combined—and without a single serious accident.

Furthermore, army and navy

records to 1923 show that in all the thousands and thousands of miles flown by Glenn L. Martin planes only two accidents have occurred in which officers were killed—one being due to a plane caught in a storm in the mountains and the other to another plane colliding with a Bomber.

The records established by Glenn L. Martin airplanes for stability, endurance, weight-carrying capacity and economy of operation long since carried them to the front, and daily performance based on the quality built into the machines is keeping them there.

THE GLENN L. MARTIN COMPANY

Cleveland

Builders of Quality Aircraft since 1909